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THE COMMITTEE ON EDUCATIONAL RESEARCH
*Faculty of Education*
*University of Alberta*

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*The Alberta Journal of Educational Research*

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# THE PREDICTION OF UNIVERSITY FRESHMAN SUCCESS USING GRADE IX DEPARTMENTAL EXAMINATION SCORES

D. B. Black
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The Grade IX Departmental examination scores serve a double role in Alberta schools. They are used, first, to determine promotion to Grade X, and second, are of stated value for high school guidance programs as indicated on the back of the Grade IX Diploma as follows:

SUGGESTIONS FOR EDUCATIONAL GUIDANCE

(a) The letter gradings indicate the student's degree of success in the various subjects taken in Grade IX.

(b) A student who has secured "H", "A", or "B" standing on all Grade IX subjects can succeed, probably, in any subject of Grade X and later grades.

(c) A student who has secured a "C" standing in any subject has only a fair chance of succeeding on the Grade X course in that subject; this is especially true of Mathematics.

(d) If a student secured a "D" standing in any subject, it is very unlikely that he will succeed in the Grade X course in that subject.

(e) A student should select courses which have relationship to his occupational preference, his interests and his abilities. He should be guided by the advice of his parents, teacher-counsellors and school principal.

In this latter regard it is a known practice in most Alberta high schools for principals to assign students to given high school programs and to limit their choice of courses on the basis of the Grade IX Departmental scores.

The type of high school program a student attempts is of direct importance to his ultimate vocational objectives; for example, any student entering one of the professions requiring university training must take the matriculation program in the high school. Matriculation is determined by standing on Departmental examinations in selected Grade XII courses designated by each faculty or school within the University. It is, then, apparent that the decisions made upon entering Grade X, will directly reflect and influence each student's future educational aspirations.

The validity of the Grade IX Departmental scores in predicting

performance in Alberta high schools has been examined by Black and Ulmer (3), Moysa (9), Evans (4), and more recently by MacInnis (8). (It is noted that a more intensive study in this same area has been recently completed for the Alberta Royal Commission on Education which has now been presented to the Government). Further, the relationship of high school results, (usually Grade XII Departmental scores) to performance in the University has been examined by Safran (10), Ackroyd and Roberts (1), Fitzpatrick (6), and more recently by the Matriculation Study Subcommittee of the Joint Committee to coordinate High School and University Curricula (5), and Zurowski (11).

There have been no reported studies, however, of the relationship of the Grade IX Departmental scores to success in university. It would seem that because of the influence of the Grade IX scores in initiating action that will ultimately culminate in the student entering the University of Alberta, a study of this relationship should be made. Moreover, if the relationship is found to be of sufficient magnitude, the Grade IX marks could then be used with greater confidence, with both a knowledge of their value and limitations, by high school counsellors to assist students to plan more adequately their high school program of studies early in their high school career. This study, then, seeks to examine such relationships for selected freshman courses in the University of Alberta, and, if such relationships are found to be adequate, to propose a method that would facilitate more effective use of the Grade IX Departmental scores in the high school counselling program.

A word of caution must be noted immediately. The academic road to university admission is a hard path. Department of Education statistics would suggest that about sixty percent of the Grade X students embark on a high school program that will lead directly to a high school diploma with matriculation standing. Of this particular group, only forty percent will remain in the same program at the end of three years. Of this latter group, only half will achieve matriculation standing. Only one student in twelve of those starting in Grade X in a matriculation program three years earlier, will enter the University. Of these students still in the matriculation program at the end of three years of high school, about a fifth will enroll in the fall for a second year of Grade XII. Unfortunately, no data are readily available indicating how many of these students will continue on to the University of Alberta. Alberta Grade IX students who continue, and later enter university, are a small and a highly select group. They are not in any sense "typical" Grade IX's.

This investigation will examine the performances of 529 students who entered the University of Alberta in the fall of 1956 and who

had written Alberta Grade IX Departmental examinations earlier in their school careers. The data were obtained as part of the Matriculation Study Subcommittee's investigation. Therefore, a further restriction on the study sample was that these students had also participated in the special Grade XII testing program held in Alberta high schools in May 1956.

The variables of this study are divided into two groups, predictor and criterion variables. The predictor variables are the Grade IX Departmental scores from the General Test (G/T), Reading, Literature, Social Studies "A" (Social Studies), Social Studies "B" (Language), Mathematics, and Science. The criterion variables were the final freshman University grades in the following areas:

a. Chemistry which consisted of grades from Chemistry 40 and 42, both first year introductory chemistry courses;
b. Education 176, an introductory course in educational psychology;
c. Education 180, a course in educational methods;
d. English 2, a first course in English Literature;
e. English 5, English Language and Literature, a first year course;
f. History, which consists of the grades from History 8 and 10;
g. Mathematics, which consists of grades from Mathematics 1, 3, 5, 40, 45, all first year Mathematics courses;
h. Mathematics (Engineering), which is the freshman mathematics course for engineers (Math. 2);
i. Physics, which consists of grades from Physics 40 and 41, both first year courses in physics;
j. Physics (Engineering) which is the freshman physics for Engineers (Physics 21);
k. Psychology 40, an introductory course in general psychology;
l. Zoology 1, a course in elementary zoology;
m. Engineering Average, which is the average mark of freshman engineers and includes marks from Engineering courses other than those noted above;
n. University Freshman Average, which is the freshman average for all courses taken during the student's first year in the University.

The criterion variables selected for study were chosen from those courses a freshman would be likely to include in his first year program. Because of the widespread interest in Engineering by male high school students, several Engineering courses and freshman Engineering Average were identified separately.

The data for the students in the sample were placed on punch cards and analysed by electronic computer to produce first, zero order correlation coefficients, means and standard deviations, and second, to produce multiple correlation coefficients and relative Beta weights from which differential multiple grade prediction equations would be developed. The method used in this latter analysis was that developed by Horst (7).

The results of the two analyses are reported in the two tables below:

TABLE I

ZERO ORDER AND MULTIPLE CORRELATION COEFFICIENTS OF SEVEN GRADE IX PREDICTOR VARIABLES WITH FOURTEEN UNIVERSITY FRESHMAN CRITERION VARIABLES

| | | | | Zero Order Correlation Coefficients | | | | | | | Multiple Correlation Coefficient |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | General Test | Reading | Literature | Social Studies A | Social Studies B | Mathematics | Science | |
| Grade IX Predictor Mean | | | | 75.7 | 75.8 | 35.8 | 73.4 | 78.8 | 78.2 | 76.7 | |
| Grade IX Predictor S.D. (N=529) | | | | 14.0 | 14.3 | 6.8 | 13.9 | 12.4 | 12.4 | 13.6 | |
| University Course | N | M'n | SD | | | | | | | | |
| Chemistry | 336 | 60.2 | 14.0 | .147 | .159 | .176 | .173 | .335 | .318 | .343 | .391 |
| Education 176 | 86 | 63.4 | 9.1 | .371 | .441 | .451 | .278 | .464 | .397 | .548 | .587 |
| Education 180 | 86 | 65.5 | 8.5 | .274 | .300 | .371 | .283 | .302 | .439 | .384 | .480 |
| English 2 | 196 | 56.3 | 10.6 | .326 | .463 | .434 | .471 | .416 | .418 | .503 | .614 |
| English 5 | 149 | 60.4 | 7.3 | .303 | .357 | .435 | .363 | .349 | .285 | .261 | .454 |
| History | 83 | 56.4 | 9.5 | .136 | .193 | .057 | .261 | .408 | .142 | .382 | .449 |
| Mathematics | 137 | 58.8 | 18.0 | .244 | .021 | .122 | .126 | .375 | .394 | .296 | .495 |
| Mathematics (Engineering) | 131 | 60.5 | 17.7 | .210 | .127 | .196 | .219 | .246 | .380 | .223 | .380 |
| Physics | 83 | 56.2 | 13.9 | .115 | .114 | .101 | .222 | .327 | .416 | .299 | .421 |
| Physics (Engineering) | 131 | 61.6 | 20.2 | .158 | .116 | .155 | .141 | .262 | .311 | .289 | .349 |
| Psychology 40 | 77 | 57.2 | 8.6 | .289 | .285 | .278 | .290 | .390 | .429 | .389 | .481 |
| Zoology 1 | 127 | 56.7 | 13.5 | .157 | .158 | .166 | .220 | .312 | .383 | .330 | .389 |
| Engineering Average | 131 | 63.3 | 10.8 | .119 | .202 | .246 | .239 | .285 | .340 | .295 | .363 |
| University Average | 529 | 61.0 | 10.6 | .203 | .169 | .190 | .186 | .309 | .374 | .324 | .408 |

TABLE II

TABLE OF RELATIVE BETA WEIGHTS FOR GRADE IX SCORE VARIABLES REPRESENTING THE BEST COMBINATION OF PREDICTOR VARIABLES FOR FOURTEEN UNIVERSITY FRESHMAN PERFORMANCE VARIABLES

| University Freshman Courses (Criterion) | Grade IX Departmental Score (Predictors) | | | | | | |
|---|---|---|---|---|---|---|---|
| | General Test | Reading | Literature | Social Studies A | Social Studies B | Mathematics | Science |
| Chemistry | | —.080 | | | .164 | .165 | .197 |
| Education 176 | .144 | | .197 | | | | .412 |
| Education 180 | | | .252 | | | .354 | |
| English 2 | | .098 | .177 | .239 | | | .307 |
| English 5 | | | .385 | | | .175 | |
| History | | | —.217 | | .350 | | .264 |
| Mathematics | .232 | —.245 | —.158 | —.172 | .383 | .313 | |
| Mathematics (Engineering) | | | .113 | | | .345 | |
| Physics | | | | | .174 | .337 | |
| Physics (Engineering) | | | | | | .254 | .178 |
| Psychology 40 | | | .168 | | | .321 | .198 |
| Zoology 1 | | | | | .158 | .302 | |
| Engineering Average | | | | | | .299 | |
| University Average | | —.051 | | | .118 | .264 | .143 |

Table I reports the means and standard deviations of the predictor and criterion variables as well as the correlation coefficients between the predictor variables and the criterion variables singly and in weighted combinations to give the maximum degree of relationship possible. The effect of the selection that takes place in the high school between the end of Grade IX and University entrance is readily evident in the high means of the Grade IX variables for the study sample. The means and standard deviations of the criterion variables also reflect differences in university courses which could be described as easy or difficult courses in which to get high marks. Of greater significance is the variability of scores which in a number of courses, notably, the physical sciences, exhibit very high standard deviations beyond that for the University freshman average. Undoubtedly, such differences reflect the marking practices of the Departments concerned. The zero order correlation coefficients of the criterion variables with each of the predictor variables range from .057 to .548. When all Grade IX predictor variables are combined and weighted to give a maximum relationship, the validity correlation coefficients (R's) were found

to range from .349 to .614. Combining predictor variables to produce an optimum relationship with the criterion variable resulted in increases over the highest zero order correlation coefficient for each criterion ranging from negligible in the case of Mathematics (Engineering) to over ten points in the case of Mathematics and English 2.

It can also be concluded from Table I that it is possible to predict success in related University freshman courses on the basis of Grade IX results with a sufficient degree of accuracy that such predictions could be of a real value in the guidance program in the early high school years. Further, the evidence of Table I suggests that such predictions should be in the form of multiple regression prediction equations using a variety of Grade IX Departmental scores as predictor variables.

Before developing the prediction equations for the fourteen University variables, it would be of interest to examine the weightings of the various predictor variables that contribute to maximum relationships indicated above. These are presented as relative Beta weights in Table II from which a number of general observations can be made. First, the contribution of the Grade IX Departmental Mathematics score is by far the greatest of any of the seven predictor variables. Not only does Mathematics IX contribute to the prediction of eleven of the fourteen criterion variables but its contribution in terms of the size of the relative Beta weights is consistently large.

The contributions of the General Test, the Reading Test, and Social Studies "A" are also interesting. The General Test contributes to the prediction of only two criterion variables, Education 176 and Mathematics; however, the contribution in both cases is sizeable. Social Studies "A" also makes a considerable contribution to the prediction of English 2 and Mathematics. However, in case of the Mathematics criterion variable, it functions as a suppressor variable contributing negatively to the prediction. Reading, on the other hand, contributes appreciably only to the prediction of Mathematics but here again, only as a suppressor variable. Reading does contribute slightly to the prediction of Chemistry and University Freshman Average as a negative variable, and to English 2 as a positive contributor. In these latter three cases, however, the relative contribution is not great.

Next to Grade IX Departmental Mathematics scores, scores in Literature, Social Studies "B" (Language) and Science contribute most frequently to the prediction of the fourteen University freshman criteria. Only Literature of these three predictors, functions as a suppressor and here, in only two courses History (—.217) and Mathematics (—.158).

In many ways, the above table verifies earlier findings of the two factor nature of the abilities being measured by the Departmental examinations reported in studies of the relationship of Grade IX Departmentals scores to the Verbal and Quantitative scores of the Cooperative School and College Ability Test: Level 3 (2).

The relative Beta weights reported in Table II were combined with the means and standard deviations of both predictor and criterion variables for the appropriate sub-sample from Table I to produce the prediction equations. These, along with the standard errors of measurement, are reported in Table III.

TABLE III

REGRESSION EQUATIONS AND STANDARD ERROR OF MEASUREMENT FOR PREDICTING FOURTEEN UNIVERSITY FRESHMAN COURSE AREAS USING GRADE IX DEPARTMENTAL SCORES

| University Freshman Course | N | Grade IX Predictor Variables | | | | | | | Constant | Standard Error of Measurement |
|---|---|---|---|---|---|---|---|---|---|---|
| | | General Test | Reading | Literature | Social Studies A | Social Studies B | Mathematics | Science | | |
| Chemistry | 336 | | —.078 | | | .182 | .188 | .204 | 21.01 | 12.9 |
| Education 176 | 86 | .090 | | .252 | | | | .290 | 26.61 | 7.3 |
| Education 180 | 86 | | | .302 | | | .257 | | 34.70 | 7.5 |
| English 2 | 196 | | .079 | .272 | .188 | | | .262 | 5.41 | 8.4 |
| English 5 | 149 | | | .419 | | | .097 | | 37.99 | 6.5 |
| History | 83 | | | —.303 | | .289 | | .188 | 30.68 | 8.5 |
| Mathematics | 137 | .298 | —.304 | —.374 | —.212 | .579 | .444 | | 5.13 | 5.6 |
| Mathematics (Engineer) | 131 | | | .312 | | | .540 | | 6.74 | 16.4 |
| Physics | 83 | | | | | .193 | .347 | | 14.54 | 12.6 |
| Physics (Engineer) | 131 | | | | | | .442 | .268 | 5.21 | 18.9 |
| Psychology 40 | 77 | | | .226 | | | .228 | .129 | 21.67 | 7.5 |
| Zoology 1 | 127 | | | | | .169 | .311 | | 19.61 | 12.4 |
| Engineering Average | 131 | | | | | | .278 | | 41.20 | 10.1 |
| University Average | 529 | | —.038 | | | .101 | .225 | .111 | 29.83 | 9.7 |

In examining Table III, it will be noted that the standard errors of measurement in many courses have not been appreciably reduced from those reported for the distribution of criterion scores. Certain cautions, then, must be exercised in the interpretation of the predicted scores.

Table IV (below) shows the use of the prediction equations for student "X" given his Grade IX examination results. Viewing the predictions for this student as a whole, the chances are three in four that this student will achieve a University Average of 50 or

better. In other words, on the basis of other students who have remained in high school and who subsequently have gone on to University with a Grade IX record like "X" 's, three out of four have achieved a passing average at the end of the first year.

TABLE IV

EXAMPLE OF USE OF GRADE IX SCORES OF STUDENT "X" TO PREDICT SUCCESS IN FOURTEEN UNIVERSITY FRESHMAN AREAS

| Grade IX Departmental Record | | University Freshman Prediction | | |
|---|---|---|---|---|
| Subject | Scores | Course Area | Score | S.E. Meas. |
| General Test | 75 | Chemistry | 61 | 12.9 |
| Reading | 70 | Education 176 | 67 | 7.3 |
| Literature | 40 (out of 50) | Education 180 | 69 | 7.5 |
| Social Studies "A" | 70 | English 2 | 56 | 8.4 |
| Social Studies "B" | 70 | English 5 | 63 | 6.5 |
| Mathematics | 85 | History | 54 | 8.5 |
| Science | 80 | Mathematics | 55 | 5.6 |
| | | Mathematics (Engineering) | 65 | 16.4 |
| | | Physics | 57 | 12.6 |
| | | Physics (Engineer.) | 64 | 18.9 |
| | | Psychology 40 | 60 | 7.5 |
| | | Zoology 1 | 58 | 12.4 |
| | | Engineering Average | 65 | 10.1 |
| | | University Average | 57 | 9.7 |

Predicted marks with given standard errors of measurement are not likely to have much meaning for students as such, with the additional possibility that teacher-counsellors may also have difficulty in interpreting them. To assist in this interpretation, a Grade IX-University Success Probability Profile chart has been developed from the study data and is presented in Figure 1.

The profile is obtained by plotting the predicted scores (first determined from the prediction equations presented in Table III for each University course area) on the Profile in the appropriate score band. The predicted grades for Student "X" presented in Table IV are those plotted on the Profile in Figure 1. All predictions of success on the Profile are based on the probability that the student will achieve a pass mark of 50. The probabilities of success are grouped in five bands on the Profile and are identified by the following titles: *Very Doubtful* (odds of one chance in eight or less that the student will achieve a pass mark); *Doubtful* (odds of success lying between one chance in eight and one chance in three); *Risky* (odds of success lying between one chance in three

and two chances in three); *Fair* (odds of success lying between two chances in three and seven chances in eight); and *Good* (odds favoring success of better than seven chances in eight).

GRADE IX--UNIVERSITY SUCCESS PROBABILITY PROFILE

| University Course | Chances of Passing | | | | |
|---|---|---|---|---|---|
| | Very Doubtful | Doubtful | Risky | Fair | Good |
| Chemistry | 35 and below | 36 - 44 | 45 - 54 | 55 X 64 | 65 and above |
| Education 176 | 41 " " | 42 - 46 | 47 - 53 | 54 - 58 | 59 " " |
| Education 180 | 41 " " | 42 - 46 | 47 - 53 | 54 - 58 | 59 " " |
| English 2 | 40 " " | 41 - 45 | 46 - 54 | 55 X 59 | 60 " " |
| English 5 | 42 " " | 43 - 46 | 47 - 53 | 54 - 57 | 58 " " |
| History | 40 " " | 41 - 45 | 46 X 54 | 55 - 59 | 60 " " |
| Mathematics | 43 " " | 44 - 47 | 48 - 52 | 53 X 56 | 57 " " |
| Mathematics (Engineering) | 31 " " | 32 - 41 | 42 - 58 | 59 X 68 | 69 " " |
| Physics | 35 " " | 36 - 43 | 44 - 56 | 57 X 64 | 65 " " |
| Physics (Engineering) | 28 " " | 29 - 40 | 41 - 59 | 60 X 71 | 72 " " |
| Psychology 40 | 41 " " | 42 - 46 | 47 - 53 | 54 X 58 | 59 " " |
| Zoology | 35 " " | 36 - 43 | 44 - 56 | 57 X 64 | 65 " " |
| Engineering Average | 38 " " | 39 - 45 | 46 - 55 | 56 - 61 | 62 " " |
| University Average | 38 " " | 39 - 45 | 46 - 54 | 55 X 61 | 62 " " |

**Figure 1.** Prediction Chart of Achieving Pass Mark (50) in Specified University Freshman Courses Using Grade IX Departmental Examinations Scores Plotted for Student "X".

Looking at the Profile for Student "X" presented in Figure 1, it is noted that this student's chances of success in University based on his performance on the Grade IX Departmentals are for the most part good and if his performance in high school remains at the same level as it has in Grade IX, there is every likelihood that if this student should go on to University, he will be successful. In planning Student "X" 's high school course and in considering his vocational choice, the lowest prediction of success, History, should be considered. This prediction would suggest that if the student's

academic objectives will require History courses, he should give particular attention to improving his background in this and related areas by the prudent selection of courses in his high school program.

It must be strongly emphasized that the most important consideration in the use of the Profile and the grades predicted from the Grade IX Departmental results, is not so much the actual predicted grades themselves or the specific chances of freshman success in each course area, because this can be done with greater accuracy later in the students' high school careers. Rather it is the value of the Profile in its use as a device to initiate action on the part of the student to become aware of his potentials for higher education in order that he and his counsellor can begin planning his educational program early in his high school experience.

Student "X" in the example promises no serious difficulties in high school programing. For the student planning a career requiring a university training but whose predictions are indicative of marginal university success, serious attention should be given to programming this student's high school courses to strengthen a weak Grade IX performance in selected areas and to emphasise the diligence that will be needed to achieve his educational and vocational goals. In the light of this "remedial" planning, a more realistic decision as to vocational goals and aspirations will be made later in high school when the effects of the planned courses can be assessed. The Profile, then, should be used only as a "warning" device, not a final selection instrument. For the marginal student whose vocational aspirations do not require university training, his program can be planned according to his educational and vocational objectives.

The school administrator who is unfamiliar with the research references concerning the validity of the Grade IX Departmental scores, can rely only on their use for guidance as directed on the back of the Grade IX Diploma and on his own judgment. In this event, no recognition is likely to be made of the differential nature of the Grade IX Departmental examinations to predict success in later academic endeavor. Moreover, administrators relying solely on personal judgment are not likely to be fully cognizant of the magnitude of such differences. If they are, there is little present evidence of the application of this information in the general programming practices in the Alberta high schools with which this investigator is best acquainted. Consequently, it is vital to the effective utilization of student manpower and to the attainment of the basic objectives of the high school, that such differences be made known both to the student and to those responsible for directing student course choices. This particular study while in no sense

definitive, does seriously question the validity of the statements on the back of the Grade IX Diploma. The investigator can plead only that such directions be viewed realistically in the light of presently known research evidence and plead for more definitive studies concerned with this vital period of decision in a student's academic career.

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# RECENT DEVELOPMENTS IN FRENCH SECONDARY EDUCATION

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Immediately after World War II there were plans in France for some far-reaching reforms in the state educational system. The most notable proposals were contained in the report of a government commission headed by Paul Langevin and other professors of the Collège de France. The Langevin Commission envisioned for France a new school system which would be more just for all because it would be based on "the complementary principles of equality and diversity of talents." Specifically the Commission recommended: compulsory school attendance to age 18; a system of "common" schools with successive cycles (a cycle of observation and guidance for boys and girls in the 11 to 15 age range, and a cycle of more specialized studies for the 15 to 18 age group); and sweeping changes with respect to methods of instruction, examinations, and teacher preparation (4).

After the Langevin Report was published, it was expected that France would promulgate a comprehensive law giving effect to the recommendations of the Report. Why, then has France not passed an act similar to England's Education Act of 1944? The explanation lies in the complex of political, economic, and religious conditions which have existed in France since the War. The shaky postwar governments in France have been unwilling to undertake educational reforms which to many Frenchmen might seem impetuous. Some of the proposals of the Commission would require large expenditures, others would arouse controversy because they run counter to established patterns in French culture.

Although there has been no postwar "education act" in France, the Governments of the Fourth and Fifth Republics have made, on a piecemeal basis, some significant changes in the laws and regulations relating to secondary schools. The purpose of this article is to identify some of the recent trends in secondary education in France.

## Jean-Paul Chooses a Secondary Program

What happens today in France when a family wishes to send a boy or girl to a state secondary school? Consider a fictitious boy named Jean-Paul in a primary school in a French town. When Jean-Paul reaches the age of 11 years, he faces an important decision in his school career. Many of his classmates will continue for three

more years in the primary school, and then transfer to an apprenticeship program or enter directly into employment. Suppose Jean-Paul's family has the aspirations and the means to send him to a secondary school. To determine his eligibility to gain admission to a secondary school program he must sit for an entrance examination called *examen d'entrée en sizième,* administered by the school officials of the département. The usual practice is to scrutinize the school dossier of Jean-Paul as well as his scores on the entrance test (3).

The choice of secondary program for Jean-Paul will depend on his performance in the entrance examination and the wishes of his family. There will likely be three main types of secondary program available in Jean-Paul's town: the classical, the modern, and the technical. For purposes of illustration the timetable for a seven-year modern program is shown in the accompanying Table. A classical program would differ as follows: addition of several hours for Latin (and possibly Greek), deletion of the second modern language, and reduction of the hours for mathematics and science. A three- or four-year technical program, begun usually when the student is 14 years of age, has a general education side and a technical or vocational side.

In Jean-Paul's town there will likely be several different secondary institutions, each offering one or more of the main types of

TABLE I

TIMETABLE FOR SEVEN-YEAR MODERN PROGRAM IN A FRENCH SECONDARY SCHOOL SHOWING HOURS OF INSTRUCTION PER WEEK (8, p. 34)

| | 6th | 5th | 4th | 3rd | 2nd | 1st | Terminal Class |
|---|---|---|---|---|---|---|---|
| French | 6 | 5 | 5 | 5 | 4 | 4 | |
| Mod. Lang. I | 5 | 5 | 3 | 3 | 3 | 3 | |
| Mod. Lang. II | | | 4 | 4 | 4 | 4 | Choice |
| Hist. & Geog. | 2½ | 2½ | 2½ | 3 | 3½ | 4 | of |
| Mathematics | 2 | 2½ | 2½ | 2½ | 4 | 4 | pattern: |
| Sciences | 1½ | 1½ | 1½ | 1½ | 4½ | 4½ | |
| Phys. Educ. | 2 | 2 | 2 | 2 | 2 | 2 | philosophy |
| Drawing | 1½ | 1 | 1 | 1 | 1 | | or |
| Music | 1 | 1 | 1 | 1 | | | experimental |
| Manual Tr. | 1 | 1 | 1 | 1 | | | sciences |
| Civic & moral instruction | ½ | ½ | ½ | ½ | | | or mathematics |

program. The *lycée* and the classical college specialize in the classical program. The modern college and the technical college offer their respective programs. There is a current trend for each

institution to offer more than one type of program: the *lycée* may comprise classical and modern sections, a modern college may include a technical section.

### The Existing Structure: Legacies from the Past

Traditionally, French schools have been divided into major divisions as follows: primary, secondary, technical, and higher. As projected by Condorcet and other *philosophes* of the eighteenth century, these divisions were supposed to be super-imposed on one another in accordance with ideals of liberty, equality, and fraternity. What actually developed during the nineteenth and twentieth centuries was a complex system of schools with vertical divisions on the basis of social class and wealth. Each of the divisions or "orders" evolved its own ideology, reflecting the values of the social class from which it drew its students. The primary schools served the lower classes, with some post-primary education available in superior primary schools. The secondary schools served an élite group drawn from the upper classes and each *lycée* or *collège* usually had its own primary or preparatory department. The technical schools, whose development dates from the Astier Law of 1919, occupy a niche in the social scale somewhere between the primary and secondary "orders".

Religion has also been a divisive factor, creating a schism in French education. On the one side there is the state system of secular schools with control centralized in the National Ministry of Education. On the other side there is the system of private schools, most of which are under the control of the Roman Catholic Church. In planning their programs the private schools in France have in theory a great deal of freedom, but in practice the private schools usually find it necessary to prepare students for state examinations, hence their programs closely resemble those in the state schools. Under recent Republics the private schools have not had access to public funds, but there is evidence of increasing aid of an indirect nature through allowances to families. Approximately one third of all secondary school students in France are now in private schools (8, p. 15).

### Wider Opportunities Within the Existing Structure

Although the general structure of French education remains the same, there are some recent developments in secondary education which indicate a desire on the part of the educational authorities to mitigate the class-conscious elements and promote greater equality of opportunity.

During the first four years of the seven-year secondary program there is now more flexibility in permitting students to transfer from

one type of program to another. The main exception remains the classical program: to have access to this program boys and girls must begin the study of Latin at age 11 or 12.

A new type of secondary school has emerged in France since the War. The *collège moderne* has arisen like a phoenix out of the ashes of the old superior primary school. Standing midway between the *lycée* and the *collège technique*, the *collège moderne* in its aims and programs bears some resemblance to the public high schools in Canada.

The *cours complémentaire*, still attached to the primary school system, now offers a four-year program comparable to the first four years of the "modern" program in a secondary school. After completing the *cours complémentaire*, the better students may transfer to a regular secondary school or seek admission to a state normal school for elementary school teachers. The number of students in the *cours complémentaire* has increased rapidly since the War.

Technical education in France is expanding, but not fast enough to meet fully the needs of present-day society. One of the main problems is to make courses in vocational subjects more respectable in the eyes of the academically-minded French, who seem to follow Aristotle in making a sharp distinction between "liberal" and "illiberal" subjects. The following recent developments show a serious attempt to promote technical education:

(a) organization of apprenticeship centers for boys and girls.

(b) inclusion of technical sections in some *lycées* and *collèges moderne*.

(c) expansion of programs in the local technical colleges and national technical schools.

(d) creation of baccalaureats for technical and commercial students.[1]

There is a trend in France to decentralize facilities for secondary education. Boys and girls who live on farms or in small villages have usually found it necessary to go to the nearest town to complete their secondary education, seeking accommodation as an *interne* in a *collège* or *lycée* with dormitories. The cost of room and board away from home has imposed a burden on families and school budgets, and set up a barrier to the progress of many deserving students. The transportation of pupils by bus has not developed much in France since the War, certainly not on a scale comparable to the expansion of school bus services in Canada. During a recent visit in the *département* of the Bouhes-du-Rhone, the writer saw

[1]The baccalaureat, terminal examination for secondary education in France, continues to be an important factor determining the nature of the program. The creation of new kinds of baccalaureat has been a noteworthy development in recent years.

no evidence of expenditure of state funds for transportation of students; in a few cases some bus facilities were provided through the private initiative of groups of parents or companies operating oil refineries near Marseille. The French are now trying to solve the problem of secondary education for rural students by expanding the secondary programs in villages and small towns, and by persuading more teachers with high qualifications to serve there.

Tuition fees for state secondary schools were abolished shortly before World War II, re-established by the Vichy régime, and abolished again by the Fourth Republic immediately after the War. More state bursaries are now available in France to help families pay costs of secondary education.

### The French Ministry of Education Tries Some New Methods

The method called *explication de texte*[1] continues to be the basic method used in classical and modern programs. Motivation of studies through individual rivalry is still an important aspect of French secondary education, but some attempts have been introduced in recent years to mitigate the harsh features of the grinding for the *bachot*[2] and the competitive examinations known as *concours.*

In an effort to introduce some new methods the French Ministry of Education has organized *classes nouvelles.* According to latest information available "new" classes are now in operation on a trial basis in sixty regular *lycées* and six *lycées pilotes.* The "new" classes stress activity methods, study of the child, correlation of school subjects, and inclusion of some handicrafts or fine arts in the program of each student. It is difficult to foretell the future of these *classes nouvelles,* which have become the focus for some bitter debates in French educational circles. In ancient Roman times Cato hated all things Greek, and Varro loved all things Greek; in modern France it seems that Alain (1) hates the "new" education and Médici (7) loves the "new" education. Hans (2) and Mallinson (6), close observers of French education and writers in comparative education, believe that the "new" classes in France will have a desirable leavening effect on a school system which even its friends would admit shows defects of formalism and abstraction.

### Teacher Preparation: CAPES or Agrégation?

To qualify for a teaching post in a state secondary school in France a candidate must first obtain a licentiate degree from a

[1]Variously known as *praelectio*, prelection, or *lecture expliquée*. An intensive method of studying literary materials perfected in Jesuit Collèges during the sixteenth and seventeenth centuries.

[2]Student argot for "baccalaureat".

university[1]. The holder of such a degree can obtain a position directly as an assistant staff member in a lycée or collège. If the candidate wishes to have full certification he must complete more studies and undergo further tests. He may choose one of two possible routes to certification: the CAPES[2] or *agrégation* (8, p. 38). The CAPES route, first introduced in 1952, is now chosen by the majority of beginning teachers. This route requires the candidate to complete a year of professional work in a pedagogical center with stress upon supervised student teaching. The other route to certification, at a higher level, is the competitive examination known as *agrégation*. Traditional symbol of superior scholarship in a secondary school subject, the *agrégation* carries a great deal of prestige in French educational circles. Those teachers who achieve the distinction of becoming *agrégés* (about one third) usually obtain preferred positions in *lycées*, but in recent years one notices an *agrégé* or two on the teaching staff of a *collège* moderne or of a normal school for elementary school teachers.

## Summary

Dating from Renaissance times, there has been a tradition in France that the main aim of secondary education is the preparation of an élite group for positions of leadership, and that the classical program is the best means of accomplishing this aim. The lycée with its core of Latin studies remains the state secondary institution with the greatest prestige in France.

Comparing an average program in a French secondary school with an average program in a Canadian high school, it is evident that the program in France devotes a larger proportion of the student's time to the study of languages, literature, and philosophy. The student in France who has completed the classical or modern program has likely developed superior skill in writing a polished essay on some topic of literary or philosophical import. It would appear that the French system excels in producing men of letters, lawyers, journalists, and professors of languages and literature; on the other side of the ledger the French system might be charged with inadequacies from the point of view of preparing technicians, engineers, and scientists. The student in Canada who graduates from high school with matriculation standing has probably studied more science than his counterpart in France, and has probably developed more skills in working with others on the solution of problems.

In a general way, the interpretation of *culture générale* in a

[1]After completing secondary school studies and passing the baccalaureat, the candidate usually takes three years of university to qualify for the *licence d'enseignement*.

[2]Abbreviation for *certificat d'aptitude au professorat de l'enseignement public du second degré*.

*lycée* or *collège* suggests a bias towards rationalism in French educational philosophy, whereas the programs and methods in a Canadian high school indicate a bias towards empiricism.

Since World War II successive Ministries of National Education in Paris have carried out minor reforms in secondary education. These reforms have sought to overcome old prejudices which created sharp distinctions between elementary and secondary education, between "liberal" and "illiberal" arts. Steps have been taken in the direction of widening educational opportunities. The steps so far taken have been small, hesitant. If France is to meet successfully the challenges posed by new developments in her national life, she must take larger, more decisive steps. The Langevin Commission indicated the paths to follow.

For a long time French education at the higher levels has had a world-wide reputation for quality. Friends of Gallic culture would hope that the French can retain the values of their educational system, and at the same time make the necessary adjustments to new conditions.

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# PUBLIC AND PROFESSIONAL OPINION REGARDING THE TASKS OF ALBERTA SCHOOLS[1]

One of the great continuing controversies of history has centered upon the objectives of education. From Plato to Dewey the question of what constitutes the best education has intrigued and challenged philosophers and educators and has produced many different answers. In modern times the controversy has been intensified by the advent of universal public education. This has caused people from all strata of society to enter the controversy, feeling that they have the right, and even the responsibility, to do so. Other factors also, such as the rapidity of change in modern society, have served to stimulate the debate. The result is that no single, clear statement has emerged from society as to the desirable objectives or tasks of public education.

But even as the controversy continues the public schools must operate with some clearly defined set of tasks. The set in effect at any given time is probably a compromise position between divergent views within the public and within the groups of those who are professionally concerned with education. Since it is a compromise, the set of tasks which governs the operation of the schools is continually subject to criticism from many sources. But in periods of unusually strong criticism the question arises as to whether or not the present compromise position is appropriate. Determining its appropriateness involves two steps. The opinions of the public and professionally interested groups must be obtained, and then, where there is disagreement, judgements must be made regarding the relative weights to be assigned to opinions from different sources.

This study is concerned with the first of these steps. The purpose is to determine public opinion and opinion of pertinent professional groups regarding the desirability of tasks which might be performed by the elementary and high schools of Alberta.

More specifically the purposes are as follows:

1. To determine public opinion in Alberta regarding the relative order of importance of different possible tasks of the schools.
2. To determine the opinions of provincial and urban school superintendents, members of the Faculty of Education of the

[1]This is a summary of the report: *Tasks of Alberta Schools—Public and Professional Opinion*, Projects in School Administration, No. 4, Division of Educational Administration, University of Alberta, Edmonton, Alberta. The study was conducted by the Division of Educational Administration with the financial support of the Alberta Royal Commission on Education. Considerable assistance was provided by the Department of Education, city School Boards, and the Department of Municipal Affairs.

University of Alberta, and members of other faculties of the University of Alberta regarding the order of importance of different possible tasks of the schools.

3. To determine the order of importance of the tasks of education as presently practiced in the schools.
4. To compare the opinions of the groups specified with present practice in the schools so that it may be seen where the opinions imply support of present practice and where they imply criticism.
5. To determine the differences of opinion which may exist among groups when members of the public are classified into different categories of occupation, income, age, sex, religion, years of education, and ethnic origin.

It should be noted with emphasis that nothing in this study pertains to the degree of success that the schools have in accomplishing their objectives or tasks. It has only to do with the relative importance or emphasis placed upon different tasks.

### The Opinionnaire

The instrument used to measure opinion and practice in this study was the *Tasks of Public Education (TPE) Opinionnaire* constructed by the Midwest Administration at the University of Chicago.[1]

The first section of the TPE is a questionnaire requesting personal information about the respondent. It is from this section that data are obtained on occupation, income, years of education, and the like. The name of the respondent is not requested.

The second and third sections obtain the respondent's opinions on the relative importance of different tasks of the elementary school and the high school, separately. There are sixteen possible tasks of the elementary school each printed separately on a small card. The respondent is asked to select, and place in the pockets provided, the one most important task, the two next in importance, the three next in importance, the four next, the three next, the two next, and, finally, the one least in importance. Respondents are asked to rank the tasks not in terms of their general importance but in terms of importance *as tasks of the school.* This procedure is then repeated with another set of tasks for the high school.

The sixteen tasks appearing on the cards for each of the elementary school and the high school were developed from an extensive investigation of the literature. A lengthy list was made of school objectives or tasks from suggestions made in a wide variety of

[1] L. W. Downey, R. C. Seager, and A. T. Slagle, *The TPE Opinionnaire,* Midwest Administration Center, The University of Chicago, Chicago, 1958.

publications. This list was then reduced to the sixteen items for each level of school by eliminating duplications and combining highly specific tasks.

The system employed by the TPE in having respondents rank the tasks is considered to be superior to other possible methods of response, such as checking those felt to be important and leaving unchecked those which are not felt to be important. The ranking system has the advantage of obtaining different degrees of importance. This is of considerable importance when the data, to be of use, must be presented as an aggregate of widely divergent opinions. A disadvantage of the ranking system is that, although the summaries show the order of importance as desired by a group, they do not indicate at what point the importance is so low that the task should be avoided by the school. Although one person has ranked all sixteen tasks in the pockets provided, he may feel that the school should be concerned only with the first three. His ranking of the remainder of the tasks is, from his point of view, casting negative votes of differing weights. Another person may feel that the school should be concerned with all sixteen tasks in the order of importance which he specifies. If this point is kept in mind when the results are interpreted much of the disadvantage is overcome.

A general criticism applying to all opinionnaires should be considered in relation to the TPE. This is the fact that the form of the opinionnaire and the wording of the items is unlikely to coincide with the way in which any given individual has his own opinions mentally organized. If there is a large difference between the frame of reference of the instrument and of the individual there will inevitably be distortion of the opinions of the individual. The usual symptom of the presence of this effect is a feeling of frustration on the part of the respondent. As it happened, the TPE proved to be remarkably successful in being able to accommodate the large number of different frames of reference of the many individuals who responded to it. The large majority of respondents were found to be enthusiastic or at least satisfied to the point of not commenting negatively. Although no systematic record was kept, a remarkably small percentage (probably not more than two or three per cent) made comments which indicated difficulty in expressing their views through the instrument.

### The Public Sample

Since the results of a study of this sort depend so heavily upon the representativeness of the sample, rather rigorous sampling techniques were employed. The province was divided into fifteen sampling units which included the large cities of Edmonton and Calgary, smaller cities represented by Grande Prairie, Red Deer,

and Lacombe, and rural areas together with towns, selected on the basis of geographic representativeness of the province. Eight school divisions and two counties formed the basis of rural sampling.

The number of people included in the sample from each sampling unit was based upon a desired total of 2500 respondents from the province as a whole. Sampling units were then assigned numbers of opinionnaires in approximate proportion to their population.

Each sampling unit was operated by the local superintendent of schools or a member of his staff. The director of a unit was asked to obtain the specified number of returns in such a way that the sample from his unit would be as representative as possible on the basis of occupation, religion, years of education, and sex. Since the instrument was administered to groups of people, the groups had to be selected carefully in order to yield the desired cross-section. Among the kinds of groups used were farmers' organizations, service clubs, church groups, employees of small industries, Home and School Associations, and labour unions.

Although the sample was drawn as rigorously as possible under the circumstances it was then formed into a miniature population. This involved determining from census data the actual proportions of people in Alberta in different categories of occupation, sex, years of education, and religious denomination. These proportions were then compared with the proportions on these variables which had actually been obtained in the provincial sample. By rejecting and duplicating cases the sample was then made identical with the Alberta population with respect to the variables. The original geographic and rural-urban provisions, followed by careful selection of groups within sampling units, followed by formation of a four-variable minature population would be expected to provide a rather rigorously representative sample of the Alberta population.

The original size of the public sample was 2171. After the miniature population was formed the public sample numbered 2999.

### The Teacher Sample

Some means was necessary to determine a ranking of the tasks of the schools which would reflect the relative emphasis placed upon the tasks in actual practice in the schools of Alberta. These relative emphases actually practiced in the schools would probably be partly determined by the provincial curriculum, partly by school and community influences, and partly by the philosophy of the teacher. For this reason it was decided that the teachers themselves were the best source of data concerning present school practice in the relative emphases placed upon the different tasks.

The teacher sample was obtained for this purpose. It was composed of approximately ten elementary and ten high school

teachers from each of the school divisions and counties, the same number from the city of Grande Prairie, and approximately fifty elementary and fifty high school teachers from each of Edmonton and Calgary. The final sample totalled 216 elementary teachers and 210 high school teachers. Elementary teachers sorted only the tasks of the elementary school and high school teachers sorted only those of the high school.

Unlike the public sample and other samples described, the teacher sample did not respond to the instrument giving opinions of the order of importance felt to be desirable. Rather, they sorted the tasks in order of importance as actually emphasized in their own classroom. Some evidence supporting the validity of this means of determining present school practice is presented in the section on findings.

### Other Samples

Samples were drawn also from three other groups: provincial and urban school superintendents (63), professors in the Faculty of Education at the University of Alberta (41) and professors in other faculties at the University of Alberta (114).

### Analysis of Data

Data from the TPE Opinionnaires were processed largely through the use of IBM equipment although calculations were performed manually. Because the measurement provided by the instrument is ordinal, at best, and because normality of the distribution could not be assumed, nonparametric statistics were used throughout the analysis.

One of the basic analyses was deriving the aggregate rank order of the sixteen tasks for a given group from the sorting provided by the respondents. This was done by assigning a number from one to seven to each of the pockets in the instrument. The pocket containing the most important task was number seven. For each task, then, a frequency distribution consisting of seven categories was formed and the median of this distribution was computed. The tasks were then ranked according to the relative sizes of their medians.

In addition to the median of the distribution for each task, the statistic Q was computed. Known as the quartile deviation, Q is a measure of the disagreement among the respondents as to the importance of the task. The larger the value of Q the more disagreement is indicated.

Whenever the rank orders of the sixteen tasks of two different groups were compared the statistical significance of the differences was computed. For this purpose recourse was had to the medians

upon which the rank orders were based. The test applied was the median test.[1] In all cases the one per cent level of significance was used.

## Public Opinion and Present School Practice

*Present School Practice*

The rank order of the sixteen tasks of the elementary school representing Present School Practice is shown in Table I. That for the high school is presented in Table II. As previously noted this ranking was based upon the responses of teachers from many parts of the province who sorted the tasks in order of the emphasis placed upon them in actual practice in their respective classrooms. To test for the possible presence of bias in the teachers' descriptions of Present School Practice, 80 parents from an elementary school Home and School Association were asked to sort the cards so as to describe their impression of present practice. Not one of the sixteen elementary school tasks showed a significant difference between parents and teachers. Thus it was concluded that there was no evidence of bias in the description of the teachers.

*Comparison of Present School Practice with Public Opinion*

*Elementary School Tasks.* From Table I it is seen that there were statistically significant differences between Present School Practice and Public Opinion on eight of the sixteen tasks. Summarizing from the table it is seen that in the opinion of the Alberta public the elementary schools should place increased emphasis upon the following tasks:

Task 29 Classification and training for a specific kind of high school program—academic, technical, etc.

Task 28 General awareness of occupational opportunities and how people prepare for them.

Task 31 An introduction to budgeting and effective use of money and property.

On the other hand, the public thought the elementary schools should place less emphasis than they do on these tasks:

Task 23 Knowledge of and appreciation for the peoples of other lands.

Task 27 Enjoyment of cultural activities—the finer things of life.

Task 25 An emotionally stable person, able to cope with new situations.

Task 16 A fund of information about many things.

[1]Sidney Siegel, *Nonparametric Statistics for the Behavioral Sciences*, New York: McGraw Hill, 1956. Pp. 111-116.

TABLE I

## COMPARISON OF PRESENT SCHOOL PRACTICE WITH PUBLIC OPINION IN ALBERTA REGARDING THE ORDER OF IMPORTANCE OF THE TASKS OF THE ELEMENTARY SCHOOL

| Tasks of the Elementary School | Present School Practice N=216 | Public Opinion in Alberta N=2999 |
|---|---|---|
| | Rank | Rank |
| 17. The basic tools for acquiring and communicating knowledge—the 3 R's | 1 | 1 |
| 19. A desire to learn more—the inquiring mind | 2 | 3* |
| 18. The habit of figuring things out for one's self | 3 | 2 |
| 20. The ability to live and work with others | 4 | 4 |
| 26. A sense of right and wrong—a moral standard of behavior | 5 | 5 |
| 25. An emotionally stable person, able to cope with new situations | 6 | 8* |
| 21. Understanding rights and duties of citizenship and acceptance of reasonable regulations | 7 | 6 |
| 16. A fund of information about many things | 8 | 10* |
| 23. Knowledge of and appreciation for the peoples of other lands | 9 | 13* |
| 24. A well cared for, well developed body | 10 | 9 |
| 27. Enjoyment of cultural activities—the finer things of life | 11 | 14* |
| 22. Loyalty to Canada | 12 | 12 |
| 30. Understanding the role of various family members | 13 | 16 |
| 28. General awareness of occupational opportunities and how people prepare for them | 14 | 11* |
| 29. Classification and training for a specific kind of high school program—academic, technical, etc. | 15 | 7* |
| 31. An introduction to budgeting and effective use of money and property | 16 | 15* |

*Difference in rank between Public Opinion in Alberta and Present School Practice for this task indicates a difference which is statistically significant at the .01 level. Differences in rank on tasks which are not marked with an asterisk are not significant differences.

Task 19 A desire to learn more—the inquiring mind.

By far the strongest implied criticism of the elementary school was that not enough emphasis is placed upon classification and training for a specific kind of high school program (Task 29). This ranks seventh in Public Opinion but fifteenth in Present School Practice.

In general, public opinion did not differ greatly on most tasks from practice in the schools. Even though eight tasks showed statistically significant differences, six of these differences were three or less in size. Of considerable importance also is the fact that the five most important tasks in the two rankings were identical.

Even though there is one reversal within the first five tasks the agreement between the two groups was still very high.

Within each of the two groups, however, there was considerable disagreement. The relative sizes of the average Q's of the distributions (1.062 compared to 0.795) indicated that Public Opinion contained a great deal more internal disagreement than did Present School Practice. The extent of the disagreement within the public group is illustrated by the fact that there was not one of the sixteeen tasks which was not placed in first place by at least a few people in the public sample. Furthermore, although the 3 R's (Task 17) obtained the rank of first in importance in the public sample, still, only fifty-one per cent of the people actually placed it first. The other forty-nine per cent felt that some other task was more important.

The three most controversial tasks in Public Opinion, that is, those with the highest values of Q, were as follows:

Task 29 Classification and training for a specific kind of high school program—academic, technical, etc.

Task 30 Understanding the role of various family members.

Task 31 An introduction to budgeting and effective use of money and property.

*High School Tasks.* The comparison of Public Opinion with Present School Practice for the tasks of the high school is shown in Table II. Again there were eight tasks on which differences between the two groups were statistically significant.

The opinion of the public was that high schools should place more emphasis on the following tasks:

Task 44 Information and guidance for wise occupational choice.

Task 45 Specialized training for placement in a specific job.

Task 47 Management of personal finances and wise buying habits.

Task 46 The homemaking and handyman skills related to family life.

The public would have the high schools place less emphasis than at present on the following:

Task 43 Enjoyment of cultural activities—the finer things of life.

Task 37 An understanding of government and a sense of civic responsibility.

Task 39 Knowledge of world affairs and the inter-relationships among people.

Task 34 The habit of weighing facts and imaginatively applying them to the solution of problems.

Of the eight tasks which showed significant differences, however, in four cases the size of the difference was three or less. As in the comparison for elementary schools, there was generally high agreement between the two groups. Again, the first five tasks were common between the two groups.

TABLE II

COMPARISON OF PRESENT SCHOOL PRACTICE WITH PUBLIC OPINION IN ALBERTA REGARDING THE ORDER OF IMPORTANCE OF THE TASKS OF THE HIGH SCHOOL

| Tasks of the High School | Present School Practice Rank | Public Opinion in Alberta Rank |
|---|---|---|
| 35. A continuing desire for knowledge—the inquiring mind | 1 | 2 |
| 33. Efficient use of the 3 R's—the basic tools for acquiring and communicating knowledge | 2 | 1 |
| 34. The habit of weighing facts and imaginatively applying them to the solutions of problems | 3 | 3a |
| 42. A sense of right and wrong—moral standard of behavior | 4 | 4 |
| 36. A feeling for other people and the ability to live and work in harmony | 5 | 5 |
| 39. Knowledge of world affairs and the inter-relationships among peoples | 6 | 8* |
| 41. An emotionally stable person—prepared for life's realities | 7 | 9 |
| 37. An understanding of government and a sense of civic responsibility | 8 | 7 |
| 32. A fund of information about many things | 9 | 14* |
| 43. Enjoyment of cultural activities—the finer things of life | 10 | 15* |
| 44. Information and guidance for wise occupational choice | 11 | 6* |
| 40. A well cared for, well developed body | 12 | 11 |
| 38. Loyalty to Canada | 13 | 13 |
| 45. Specialized training for placement in a specific job | 14 | 10* |
| 47. Management of personal finances and wise buying habits | 15 | 12* |
| 46. The homemaking and handyman skills related to family life | 16 | 16b |

*Difference in rank between Public Opinion in Alberta and Present School Practice for this task indicates a difference which is statistically significant at the .01 level. Unless otherwise indicated ranks do not differ significantly at the .01 level.

aAlthough there is no difference in rank on this task there is a significant difference in distributions with present School Practice placing the task higher in importance than Public Opinion does.

bSame as footnote "a" except that Present School Practice places the task lower in importance than Public Opinion does.

On the high school tasks the public showed about the same amount of internal disagreement as they did on the elementary school tasks. The average Q's for the two levels of schools were similar in size. Again there was no task that was not put in first place by at least a few people. The one task which gained the highest overall support from the public, the 3 R's (Task 33), was actually put in first place by only forty per cent of the people. A majority of the people felt that some other task was more important but did not agree on what the other task should be.

The three tasks which produced the most disagreement within the public were as follows:

Task 33 Efficient use of the 3 R's—the basic tools for acquiring and communicating knowledge.

Task 45 Specialized training for placement in a specific job.

Task 32 A fund of information about many things.

### Opinions of Professionally Interested Groups

*School Superintendents*

The most outstanding finding in this part of the study was that there was not a single statistically significant difference between the opinion of superintendents and Present School Practice on any task at either the elementary or the high school levels.

*Professors of Education*

The opinions of Professors of Education were in almost as much agreement with Present School Practice as were the opinions of superintendents. There were no statistically significant differences at the elementary school level and only one at the high school level. In the opinion of the Professors of Education the high schools should place more emphasis than they do upon "The enjoyment of cultural activities—the finer things of life."

*Professors of Other Faculties*

The first analysis sought to determine differences of opinion, if any, which exist among the six major faculties: Agriculture, Arts and Science, Dentistry, Engineering, Medicine, and Physical Education. Marked agreement was found. A total of only three tasks at the elementary and secondary levels showed significant differences and two of these were reflections of the special interest of Professors of Physical Education in the task involving physical fitness.

The opinions of the six faculties combined were then compared with Present School Practice. At the elementary level significant differences were found on seven of the sixteen tasks. The professors placed more emphasis than the schools do on Tasks 29, 27, and 19 and

less emphasis on Tasks 25, 26, 22, and 30. At the high school level five of the fifteen tasks showed significant differences. Professors placed more emphasis than the schools do upon Task 33 and less emphasis upon Tasks 42, 36, 41, and 38.

### Opinions As Related To Personal Characteristics

The opinions held by members of the public sample were found to be highly related to their particular characteristics with respect to occupation, income, age, sex, religion, years of education, and ethnic origin. The detailed findings of this analysis are too numerous to include here but a summary of them is provided in the section on conclusions.

### Conclusions

The general purpose of this study was to provide factual data describing the opinions of pertinent groups about the relative importance of different possible tasks of the elementary and high schools in Alberta. It was not the purpose of the study to place values upon the different points of view and to recommend modifications in the practice of the schools. Consequently, this section on conclusions is largely a summary and interpretation of the findings.

In interpreting the data several general cautions must be observed. Some of these are as follows:

1. There is no necessary implication that public opinion, professional opinion, or opinion of any specific group should exclusively govern the establishment of school policy.
2. No part of this study is pertinent to the degree of success the schools achieve in the accomplishment of their objectives. The study concerns only what the tasks or objectives presently are and what they should be in the opinion of various groups. It is possible that a task presently regarded by the schools as being highly important is not being well accomplished. Any such lack in accomplishment is not necessarily attributable to lack of emphasis upon the task. It may be caused by the difficulty of the task, the inadequacy of the instructional methods employed, or any one of a number of factors which are outside of the scope of this study.
3. Any instrument of the sort used in this study requires respondents to translate their opinions from their own private set of meanings and scheme of organization into that provided by the instrument. Although most respondents apparently had little difficulty in performing this translation, it is inevitable that some distortion of opinion has resulted.
4. It should not be inferred that any group of respondents desires the schools to perform all sixteen of the tasks or

that any group does not desire tasks to be performed in addition to the sixteen provided in the instrument.

Subject to the foregoing cautions the following conclusions are offered.

*Agreement Among Groups*

There is a considerable amount of agreement among all groups included in the study as to the relative importance of different tasks of the elementary school and of the high school. This is illustrated by the fact that all groups agree on the three most important tasks for the elementary school and also for the high school. This agreement on the most important tasks is especially significant because it is at this point that disagreement would be most disruptive.

For the elementary school the three most important tasks upon which all agree (not necessarily in order) are the following:

(a) The basic tools for acquiring and communicating knowledge —the 3 R's.

(b) A desire to learn more—the inquiring mind.

(c) The habit of figuring things out for one's self.

At the high school level the agreed three most important tasks are essentially the same:

(a) Efficient use of the 3 R's—the basic tools for acquiring and communicating knowledge.

(b) A continuing desire for knowledge—the inquiring mind.

(c) The habit of weighing facts and imaginatively applying them to the solution of problems.

In general it may be concluded that the tasks of most importance both in practice in the schools and as desired by all groups studied are what might be described as basic intellectual tasks. These are clearly predominant over the personal, social, societal, aesthetic, and vocational tasks.

*Disagreement Within Groups*

Although there is considerable agreement among different groups there is a large amount of disagreement within groups. There is not one of the sixteen tasks which was not put in first place by some people in the public sample. Neither is there one of the tasks which was not put in last place by some people. This was true of both the elementary school tasks and the high school tasks.

To express the amount of disagreement in another way, an elementary school could satisfy more members of the general public by considering the 3 R's to be its most important task than by considering any other task to be the most important. But if it did

so forty-nine per cent of the public would disagree with the first place position. At the high school level it is even worse. There is so much disagreement within the public that the first-place task attains its position by having only forty per cent of the people put it in first place.

One of the most striking conclusions of this study is that, no matter what set of objectives the schools in Alberta may undertake, that set of objectives will be contrary to the desires of large numbers of Albertans.

*Changes Desired*

Comparisons of the opinions of various groups with present practice in the schools have enabled the determination of those tasks which the groups would have the school emphasize more than it now does, those which should be emphasized less than now, and those whose present emphasis is felt to be appropriate. A summary of these results for the elementary school appears in Table III. The summary for the high school tasks is in Table IV.

The most striking conclusion that may be drawn from these summaries is that school superintendents and professors in the Faculty of Education, as groups, agree almost completely with the relative importance of the tasks as they are presently emphasized in the schools.

An overall view of the differences between public opinion and present practice in the schools presents a relatively consistent picture. There is a strong desire to have both elementary and high schools increase their emphasis upon the non-academic, practical, vocational tasks. At the same time they would have less emphasis placed upon those tasks having to do with cultural activities, citizenship, and intellectual development.

It must be concluded that the study has produced no evidence to support the contention that the public of Alberta, as a group, favours increased emphasis upon the intellectual objectives of the schools. On the contrary, the evidence indicates a desire for increased emphasis upon some non-academic tasks at the expense of some academic tasks. This is not to say that non-academic tasks are seen to be *more important* than academic tasks, but that the public places more importance *than the schools do* on some non-academic tasks and less importance *than the schools do* on some academic tasks.

It should be noted, however, that the public places a much higher value than do the schools upon classification of pupils in the elementary school to prepare them for differentiated high school programs. In view of this, the desire for increased importance of some non-academic tasks, noted above, might well indicate a desire

## Table III

## SUMMARY OF OPINIONS OF THE GROUPS STUDIED INDICATING THOSE TASKS UPON WHICH ELEMENTARY SCHOOLS SHOULD PLACE MORE, THE SAME, OR LESS EMPHASIS THAN THEY DO IN PRESENT PRACTICE

| Elementary School Tasks of the | Public Opinion | Opinion of School Supts. | Opinion of Faculty of Educ. | Opinion of Other Univ. Faculties |
|---|---|---|---|---|
| 17. The basic tools for acquiring and communicating knowledge—the 3 R's | same | same | same | same |
| 19. A desire to learn more—the inquiring mind | less | same | same | more |
| 18. The habit of figuring things out for one's self | same | same | same | same |
| 20. The ability to live and work with others | same | same | same | same (3Fac)<br>less (3Fac) |
| 26. A sense of right and wrong—a moral standard of behavior | same | same | same | less |
| 25. An emotionally stable person, able to cope with new situations | less | same | same | less |
| 21. Understanding rights and duties of citizenship and acceptance of reasonable regulations | same | same | same | same |
| 16. A fund of information about many things | less | same | same | same |
| 23. Knowledge of and appreciation for the peoples of other lands | less | same | same | same |
| 24. A well cared for, well developed body | same | same | same | same (5Fac)<br>more (1Fac) |
| 27. Enjoyment of cultural activities — the finer things in life | less | same | same | more |
| 22. Loyalty to Canada | same | same | same | less |
| 30. Understanding the role of various family members | same | same | same | less |
| 28. General awareness of occupational opportunities and how people prepare for them | more | same | same | same |
| 29. Classification and training for a specific kind of high school program—academic, technical, etc. | more | same | same | more |
| 31. An introduction to budgeting and effective use of money and property | more | same | same | same |

to have the schools increase the number of students on non-academic programs rather than necessarily to increase the non-academic content of the programs of all students. Thus the school as a whole would be increasing its emphasis on non-academic tasks and decreasing its emphasis on academic tasks but the program of a student preparing for university would not necessarily be affected in this way.

University professors in faculties other than the Faculty of Education express a general desire for the schools to increase their emphasis on the academic and aesthetic tasks and to decrease their emphasis on tasks having to do with personal development and national loyalty.

It is interesting that in stressing academic tasks the university professors also urge more classification and training in the elementary school for specific high school programs. The public, on the other hand, combined a desire for more classification with a desire for increased emphasis upon non-academic tasks. Both the public and the professors, apparently, see an increased emphasis upon classification of students for differentiated high school programs as a means of accomplishing their opposing desires. Indeed, whether or not such a resolution is desirable, it does constitute a resolution. It would provide means whereby an academic emphasis could be increased for certain students and a non-academic emphasis increased for other students.

*Opinions as Related to Personal Characteristics*

The analyses of people's opinions about the tasks of the schools when the people were classified according to certain personal characteristics produced quite definite results. People's opinions were found to be highly related to their status with respect to occupation, income, age, sex, religion, amount of education, and ethnic origin. Of these eight variables the one most highly related to opinions on school objectives was amount of education.

On reviewing the detailed results it is seen that the basic dimension of cleavage on each of the seven variables is what might be described as an academic as against a non-academic emphasis. On different variables, the nature of the non-academic position differs, but one of the two opposing positions of all variables can reasonably be described as non-academic.

The results indicate that the ideal type who emphasizes the academic objectives of the schools is a person who has high occupational status (if a woman, her husband has such status), has a high income, is young, is female, is Protestant, has a large amount of formal education, and the native language of his or her father is English.

## Table IV

## SUMMARY OF OPINIONS OF THE GROUPS STUDIED INDICATING THOSE TASKS UPON WHICH HIGH SCHOOLS SHOULD PLACE MORE, THE SAME, OR LESS EMPHASIS THAN THEY DO IN PRESENT PRACTICE

| Tasks of the High School | Public Opinion | Opinion of School Supts. | Opinion of Faculty of Educ. | Opinion of Other Univ. Faculties |
|---|---|---|---|---|
| 35. A continuing desire for knowledge — the inquiring mind | same | same | same | same |
| 33. Efficient use of the 3 R's—the basic tools for acquiring and communicating knowledge | same | same | same | more |
| 34. The habit of weighing facts and imaginatively applying them to the solution of problems | less | same | same | same |
| 42. A sense of right and wrong —a moral standard of behavior | same | same | same | less |
| 36. A feeling for other people and the ability to live and work in harmony | same | same | same | less |
| 39. Knowledge of world affairs and the inter-relationship among peoples | less | same | same | same |
| 41. An emotionally stable person — prepared for life's realities | same | same | same | less |
| 37. An understanding of government and a sense of civic responsibility | less | same | same | same |
| 32. A fund of information about many things | same | same | same | same |
| 43. Enjoyment of cultural activities—the finer things of life | less | same | more | same |
| 44. Information and guidance for wise occupational choice | more | same | same | same |
| 40. A well cared for, well developed body | same | same | same | same (5Fac)<br>more (1Fac) |
| 38. Loyalty to Canada | same | same | same | less |
| 45. Specialized training for placement in a specific job | more | same | same | same |
| 47. Management of personal finances and wise buying habits | more | same | same | same |
| 46. The homemaking and handyman skills related to family life | more | same | same | same |

On the other hand the ideal type who emphasizes the non-academic objectives of the schools is a person who has low occupational status, has a low income, is old, is male, is Catholic, has little formal education, and the native language of his or her father is French or Polish.

It should be noted, however, that there is no guarantee that the relationships found to exist between these characteristics and certain kinds of opinion are causative factors. For example, income may not determine opinion at all. It may be related to opinion only because it is also related to occupation which may be a real determiner of opinion. But whether they are causative factors or not, the reported relationships are of value in that they specify the various sources of the different components of public opinion.

# A NOTE ON "A WISC PROFILE FOR RETARDED READERS"

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It was the purpose of this research to check and supplement the findings of Altus (1956) on the differential performance of retarded readers on the subtests of the Wechsler Intelligence Scale for Children, (Wechsler, 1949) (WISC). If it can be assumed that children with evidenced reading difficulties have a particular intellectual make-up and further, that the subtests of the WISC are tapping qualitatively different aspects of intelligence, it follows that their differential performance on the subtests should be different than children not classified as retarded in reading. More explicitly, the following hypothesis will be tested: children with known reading difficulty will score significantly different on the sub-tests of the WISC than a matched group of children not so classified.

Altus (1956) using 25 children, retarded at least 2 years in reading, found particular mean subtest scores on the WISC to be significantly different from others. She found that "the subtest appears to be fairly distinctive with Coding and Arithmetic significantly lower than Vocabulary, Digit Span, Picture Completion, Object Assembly, and Picture Arrangement." The present research is a replication of Altus' (1956) investigation with two procedures added:

1. A control group of children without reading difficulty. In the Altus (1956) research it would have been possible to account for the variations found in terms of other variables common to the sample of children used, e.g. ethnic group, value of the sub-culture or sex (24 out of the 25 subjects were boys).
2. The use of the deviation scores rather than the average scaled scores. Using deviation scores i.e. the amount each subject deviated on each subtest from his own average scaled score, would give a more sensitive picture of the differential performance of poor readers on the WISC subtest.

The present research has attempted to substantiate findings of Altus incorporating these suggested procedures.

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## Procedures

Eleven children with known reading handicap were selected for the experimental group. This sample represented all the children in a summer remedial reading program. The sample consisted of seven boys and four girls, ranging in age from 7-0 to 14.8 with Mean WISC IQ's of 95.9, 104.7 and 100.3 on the Verbal, Performance and Full Scales respectively. A second sample of children without a reading difficulty was selected as a control group with Mean WISC IQ's of 99, 105.6 and 102 on the Verbal, Performance and Full Scales respectively. These subjects were matched with the remedial reading sample on the variables of age and sex.

The WISC was administered to all of the subjects in both groups. For each subject the deviation of each scaled score from the subject's own mean scaled score was computed. Each deviation score was transformed to a whole positive number. An analysis of variance was performed using the mean deviation scores for both the experimental and control groups. Analysis of variance was also performed on the mean scaled scores of the experimental group.

## Results

Table I gives the results of the analysis of variance on the deviation scores of the control group (those children with no known reading difficulties). The F of 1.55 was not significant indicating that the differences in the mean deviation scores for each pair of subtests could have been accounted for by chance.

TABLE I

ANALYSIS OF DEVIATION SCORES OF THE CONTROL GROUP

| Source | Sum of Squares | df | Mean square | F |
|---|---|---|---|---|
| Between Subtests | 10028.00 | 9 | 1114.22 | 1.55 |
| Within Groups | 71708.27 | 100 | 717.08 | |
| Total | 81736.27 | 109 | | |

TABLE II

ANALYSIS OF DEVIATION SCORES OF THE EXPERIMENTAL GROUP

| Source | Sum of Squares | df | Mean square | F |
|---|---|---|---|---|
| Between Subtests | 11923.64 | 9 | 1324.85 | 2.06* |
| Within Groups | 64385.46 | 100 | 643.85 | |
| Total | 76309.00 | 109 | | |

*Significant at the .05 level of confidence.

Table 2 gives the results of the analysis of variance of the deviation scores of the experimental group. The F of 2.06 is significant at the .05 level of confidence indicating that the differences in mean deviation scores were greater than could be expected by chance alone.

Table 3 gives the results of the *t*-tests following the F test. It shows that the mean deviation on the coding subtest was significantly lower than that of Object Assembly and Block Design. It also shows that the mean deviation for this group was significantly higher on Object Assembly than on Coding, Information, Arithmetic, Comprehension, and Vocabulary.

TABLE III

SIGNIFICANT T-TESTS OF THE EXPERIMENTAL GROUP BETWEEN MEAN DEVIATIONS*

| Subtest | Mean | Subtests | Mean | Diff. | t |
|---|---|---|---|---|---|
| Object Assembly | +1.7 | Coding | —1.2 | 2.9 | 2.69 |
| Block Design | +1.0 | Coding | —1.2 | 2.2 | 2.10 |
| Object Assembly | +1.7 | Info. | —1.1 | 2.8 | 2.61 |
| Object Assembly | +1.7 | Comp. | — .5 | 2.2 | 2.10 |
| Object Assembly | +1.7 | Arith. | —1.0 | 2.7 | 2.52 |
| Object Assembly | +1.7 | Vocab. | —1.0 | 2.7 | 2.52 |

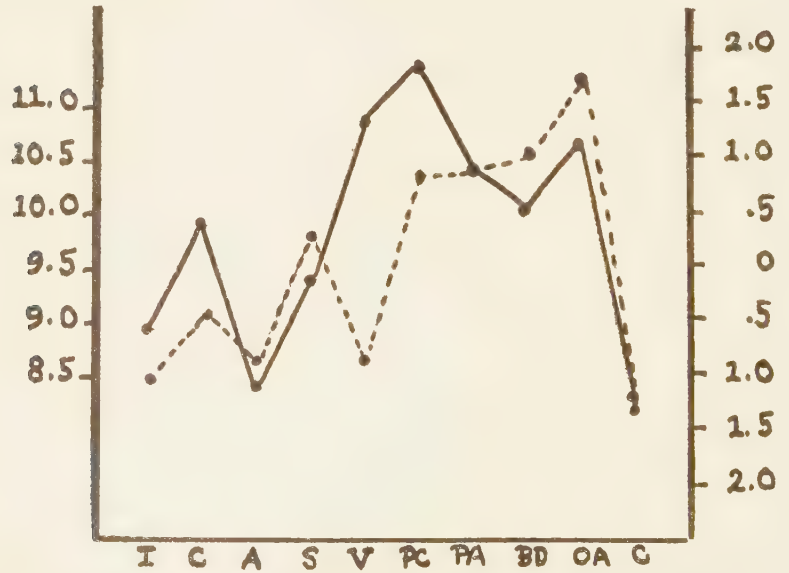


Fig. 1. Altus' findings using Mean scaled scores—Left margin-solid line. Experimental Group using Mean deviation score—Right margin—broken line.

*All t-tests reported were significant at the .05 level of confidence.

The analysis of variance of the scaled scores of the children with the reading difficulties yielded insignificant results ($F=1.75$).

## Conclusions

The results reported above permit a qualified substantiation of the initial hypotheses that certain mean deviation subtest scores of the children with reading difficulties were significantly different from each other. This was not the case with a matched sample of children having no known reading difficulty.

The present findings tend to substantiate in part those of Altus (1956).

Using deviation scores, the subtests on Coding and Arithmetic were significantly lower than Object Assembly, and Coding was also lower than Block Design. Further Altus' highest mean subtest was Object Assembly and this is substantiated by the experimental group in the present study having their highest mean deviation score on Object Assembly subtest. The only major discrepancy between the findings of Altus (1956) and those of the present study is for the Vocabulary subtest. The mean deviation for the Vocabulary subtest was one of the lowest in the present investigation.

Considering the relative agreement of the present study with that of Altus (1956) it would appear that a more comprehensive research using larger samples would prove valuable. If further research substantiates the results of this investigation, i.e. that particular intellectual variables are related to reading difficulties of children, better techniques and understanding of procedures in remedial reading programs may result.

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# MEANING AND LEARNING

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Recently in education considerable attention has been focussed on the value of meaning in learning. In increasing numbers, teachers have come to realize that if desirable outcomes of learning in terms of retention and transfer are to be achieved, the experiences encountered in the classroom must have meaning for the pupil.

## Purpose

The principal purpose of this investigation was to determine the learning outcomes resulting from the study of classroom material using methods arranged in an ascending order of meaningfulness. To achieve this purpose, an experiment was conducted in selected grade seven classrooms of the junior high schools of the Edmonton Separate School system and the Edmonton Public School system.

In the investigation, the differential effects of three instructional procedures upon learning in three subject-matter areas were studied. The three methods involve the study of materials for *facts*, the study of material to determine the important *relationships* that exist within it, and the study of material to determine the major *generalizations* that may be made from it. The effects of the varied methods were found by measuring the amount of material learned, the amount retained after a three-week interval, and the degree to which the effects of particular method were transferred to other situations. The three subject-matter areas considered in the experiment were mathematics, science, and social studies.

## Definition of Terms

For the purposes of this study, the term *fact* will be taken to mean anything that is known to exist or is accepted as being true without consideration of supporting evidence.

*Relationships* will emphasize the connection, correspondence or correlation that exists between persons or things. More specifically, the term will be restricted to cause and effect, temporal or spatial relations, and similarities and differences.

The term *generalization* will refer to general inferences that may be made from the subject matter studied in the experiment. It will include the derivation or induction of general principles or general conceptions. These generalizations would have application in the area of the material read, although they may be applied more broadly.

### Subdivisions of the Main Problem

In order to fulfill the purpose of the experiment it was necessary to subdivide the main problem for the analysis of the data. The following questions represent the major areas of investigation:

1. Does training through any one of the methods employed in this investigation, namely, the study of material for facts, for relationships, and for generalizations, tend to produce greater gains in learning than result through training in any of the other methods?
2. Does training through one particular method of study produce comparable gains in other learning outcomes? For example, does practice in the development of generalizations based on a body of subject matter produce improvement in the learning of facts and the developing of relationships?
3. Does training through one particular method of study yield greater evidence of transfer to new material within the same subject-matter area than does training through another method?
4. Within the given subject-matter field, is the amount of transfer associated with a particular method comparable for the areas of fact, relationship, and generalization?
5. Do the effects of training through one particular method of study appear to be transferred from one subject-matter area to another to a greater extent than the effects of training through another method?
6. Is the amount of transfer associated with a particular method of study comparable in the areas of fact, relationship, and generalization?
7. Does training through one particular method of study produce greater retention than training through either of the other two methods?
8. Does training through one particular method of study produce comparable retention of facts, relationships, and generalizations?

### Related Studies

*Meaning*

In a discussion of ideational learning, Brownell and Hendrickson (1950) postulate a continuum of meaningfulness for facts and concepts ranging from the level of unrelated facts or abitrary associations to the level of the development of explanatory principles and generalizations. They note, in addition, that a given fact cannot be assigned an absolute position on the continuum, but that its

meaning depends upon the individual who is involved in the learning task.

Cronbach (1954) suggests that a concept has meaning for an individual when it is consistently applied to some situations and not to others. This idea implies agreement with Spitzer who stated that "meaning is the seeing of reasons for, the import of, or the sense of, a process" (1948, p. 14). A further test of meaning is given by Davis (1948); namely, the ease with which the learner makes progress in the learning situation and the extent to which he can understand new facts.

Hildreth (1942) studied problem solving with children in grades two, three, and four and found that solutions were obtained faster and more easily when a meaningful approach was used than when the problems were attempted in a blind mechanical fashion.

Brownell and Moser (1949) reported that teaching subtraction by a meaningful decomposition method produced greater transfer and retention than either decomposition taught mechanically or the equal addition method taught mechanically or in a meaningful manner. They felt that the meaningful decomposition method was successful because it was understood by the pupils involved in the experiment, while the other methods were not.

A general conclusion offered by Swenson (1949) was that a significant advantage in learning appeared to be associated with a method of study that stressed the organization of number facts about pupil-discovered generalizations. This method, it may be noted, was the most meaningful of those used in the study.

The value of the meaningful approach to learning is well summarized by Reed (1938). In discussing the results of his investigation he noted:

> . . . the advantage of the perception of meaning is that it contains the secret of economical learning. This means that in order to learn easily, retain well and transfer skill effectively, we should emphasize the importance of the perception of meanings, relations, and principles (1938, p. 422).

*Transfer*

The influence of method of study on transfer has received attention from psychologists for some time. Woodrow (1927) investigated the relationship between transfer and method of learning to memorize. One experimental group merely practised memorizing passages; a second experimental group received specific training in how to memorize; a third group served as a control. It was found that with undirected drill, indications of transfer were generally small, either positive or negative, but that the group receiving some training in method of study exhibited considerable positive transfer.

In another early experiment, Overman (1930) attempted to measure the transfer effects of instruction given in three methods of teaching addition. He had a Generalizations group, which formulated general methods or procedures, a Rationalizations group, in which reasons and principles were discussed, and a third group for which the two methods were combined. Working with grade two pupils, it was found that the Generalizations group was superior in transfer tests, followed by the Combined group and then the Rationalization group.

A more recent study by Swenson (1949) tends to substantiate these findings. Working with three groups of grade two pupils and using the one hundred addition facts as material, she found that the group taught to organize addition facts around number generalizations was superior to a drill-plus-verification group and a drill group.

Essentially the same results had been reported by McConnell (1941). He gave four transfer tests to two groups of second grade pupils. One group had been taught by methods that were confined to specific drill on the basic addition and subtraction facts, and the other had been given instruction that emphasized the meaning and interrelationships of the combinations. The latter group was superior to the drill group on all four tests.

Theile's expirement (1939) also indicated that a more meaningful method of study, that of discovery and verification, produced superior transfer when compared with a method that emphasized drill without understanding.

In 1941, Hendrickson and Schroeder repeated Judd's classic experiment involving the submerged target, with an air gun in place of the darts originally used. They found that knowledge of theory facilitated transfer, confirming the findings of the earlier experiment. They found, in addition, that theoretical information was an aid in making the original adjustment to the first situation, a finding in contrast to that of Judd.

Katona (1940), in his study of retention and transfer, noted that, contrary to the views of the proponents of the theory of identical elements, transfer would take place when learning was accompanied by understanding whether the elements of the new situation were more or less similar to the old situation.

In stressing the significance of learning with understanding, Katona stated further:

> With meaningful learning . . . we find that there is a plasticity or flexibility of learning which permits reasonable applications in a wide scale. These applications are due, not to the transfer of specific data from an A to a B, but to the fact that meaningful learning results from the acquisition of integrated knowledge which is usable under different circumstances (1940, p. 136).

In summarizing the research reported, it appears that the most common conclusion concerning transfer of training is that transfer is facilitated by emphasis on understandings in the learning process. Methods of study stressing the importance of generalization, and specific techniques that require analysis and organization of the material seem to bring about the highest degree of transfer. In other words, the more meaningful the situation is for the learner, the greater will be the amount transferred to new situations.

*Retention*

In reviewing the literature on retroactive inhibition, Britt reported that " . . . it is well known that the degree of revival of a previously acquired activity depends on the kind and amount of activity which intervenes between the original learning of the activity and its reinstatement" (1935, p. 381).

Two major influences on the amount of interference noted in his report were the similarity of the original and interpolated material and the degree of learning of the original material. It was found that as the degree of similarity increased, the degree of retroactive inhibition also increased to a maximum, then as the materials approached identity, the amount of retroactive inhibition decreased to zero with simple repetition. It was also noted that the greater the degree of learning of the original material, the less susceptible it was to retroactive inhibition.

Hall (1955), using meaningful material (the characteristics and customs of a hypothetical primitive tribe of people) found no relationship between the amount recalled and the degree of similarity between the interpolated and original material.

Again using meaningful materials, Ausubel and his associates (1957) found that (a) proactive rather than retroactive inhibition was the determining cause of forgetting; (b) interpolated material, substantially similar to the original material, but not identical with it, does not result in retroactive inhibition, but is sometimes as valuable as repetition of the original material in improving recall. They feel that the extrapolation of the findings of experiments based on meaningful material to the classroom is a questionable procedure.

Using a variety of methods of learning addition facts with grade two pupils, Swenson (1949) was led to conclude that retroactive inhibition appeared more frequently and in greater amounts when a drill method was used than when the children were taught to organize the facts around generalizations.

Grant (1932) found positive correlations between intelligence and retention, the coefficients being the highest for meaningful material.

In investigating the retention of course outcomes in educational psychology, McDougall (1958) found that the abilities to interpret and extrapolate material were retained to a significantly higher degree than the ability to recall knowledge or translate this knowledge from one form to another. One might observe that this difference appeared to favor the more meaningful outcomes.

Tyler (1930) attempted to determine whether information that is seldom used would be more quickly forgotten than explanations that can be commonly applied to everyday life and methods of thinking that can be employed in practical situations. He gave three tests in science, one an information test, another an explanations test, and third, a generalizations test. These were repeated after an eight-month interval. There was a significant loss in the factual information test, but only slight differences in the other two, suggesting advantages in retention for meaningful material.

Freud and Cheronis (1940) reported similar findings. The subject matter best retained in a physical science course appeared to be principles and theories, their application and related facts. Materials showing the poorest retention were memorized without the use of reason.

In investigating the learning and retention of concepts, Reed (1946) noted that a set to learn meanings as well as names yielded a higher degree of retention than a set to learn names only. Logically formed concepts were found to be better remembered than those illogically formed.

In his experiment involving a memorizing group and an understanding group, Katona (1940) reported that the memorizing group tended to follow the main features of the Ebbinhaus curve. Learning by understanding, however, brought about different effects, the average performance several weeks after training being as good as performance immediately following training.

In general, support has been found for the contention that more meaningful materials, such as principles and applications, are better retained; and that methods of study that help develop meanings for children also promote retention.

## Experimental Design

### *Subjects*

The subjects for this experiment were the students in twelve grade seven classrooms in the city of Edmonton. Six classes were from five junior high schools in the Separate School system and six were from one large junior high school in the Public School system.

Before the experiment began, the twelve available classrooms were divided into four groups, three experimental and one control.

The classes within each of the experimental groups were randomly assigned the method of study they would employ during the experiment. These methods included the study of material for facts, for relationships and for generalizations.

The experimental groups and each class in the control group were to study material from two of the three subject-matter areas, mathematics, science and social studies. The subject-matter areas were assigned by chance, with the qualification that no class would study the same material during both stages of the investigation.

As a result of this division, there were three large groups formed on the basis of subject matter to be studied, a mathematics-social studies group, a science-social studies group, and a mathematics-science group. These groups each contained three experimental classes and one control class.

*Tests and Materials*

Selected bodies of subject matter, suitable to the level of the pupils involved and related to the grade seven course of studies, served as learning materials for the testing program. Three multiple-choice tests, similar in structure and equated in degree of difficulty through item analysis, were designed to accompany the learning materials and serve as pre-tests, post-tests and transfer tests. The items in these tests measured the three learning outcomes: knowledge of facts, knowledge of relationships, knowledge of generalizations. In addition, the Otis Quick-Scoring Mental Abilities Tests Beta Test was given to each of the classes. Retention after a three-week interval was measured by a second administration of the post-test in each group.

*Procedure*

Since each class was to study material from two subject-matter fields, the experiment was divided into two stages, one for each subject involved. The procedures followed in each stage of the investigation were identical.

The first period of the experiment was devoted to the administration of the intelligence test.

In the second period, a preliminary test was administered. All classes in a subject-matter group, that is, one control and three experimental classes took the same test.

The following four daily periods were utilized as training periods for the experimental classes. In these sessions the classes carefully studied short selections in the subject-matter area assigned to them. The activities of the class during this time were determined by the outcomes to be sought, one class studying the facts in the selection, another the relationships, and the third, the generalizations. The suggestions and questions of the experimenter directed the pupils'

activity during this period and they were encouraged to mark important points as they were developed during the study period. In the study of facts, for example, the pupils concentrated on identifying and marking the significant facts in the selection. No consideration was given to the relationships that existed between these facts, nor to the generalizations that could be made from them. Toward the end of the practice period in each class, a short test was administered which was designed to cover outcomes appropriate to a particular class. For example, the test for the fact class dealt only with the facts studied, no mention being made of relationships and generalizations.

During the sixth period the post-test was administered. This test measured all learning outcomes, fact, relationships and generalizations. All classes, both experimental and control in a particular subject-matter area were given the same test.

Three weeks after the administration of the post-test, a third test was administered. The purpose of this test was to determine the degree to which the effects of training in a particular method would be transferred to a new situation after an interval in which there was no training in that subject. During the same period, the post-test was repeated in all classes, as a delayed retention test. On this occasion, the reading selection was not included in the test.

The class periods for one subject-matter group are summarized in Table One.

*Treatment of the Data*

Since it was not possible to match the groups prior to the beginning of the experiment, they were equated statistically on the basis of mental ability and experience with the methods of study employed in the investigation. To do this, analysis of covariance was used with mental age and pre-test scores held constant. Where equating was not necessary, analysis of variance was employed. In all cases, the assumptions underlying the use of these techniques were first tested. For instances where these assumptions could not be met recourse was made to simpler devices for the evaluation of mean differences.

Mean differences in total scores and scores on the fact, relationship and generalization subsections of the following distributions were examined in each subject-matter area: (a) gains from pre-test to post-test; (b) transfer test scores; (c) losses from post-test to delayed retention test. The performance by the members within each of the classes on the subsections of the tests was also examined. Pre-test scores from Stage One of the experiment were controlled during the analysis of the pre-test scores from Stage Two, yielding a measure of the extent to which the effects of training were transferred from one subject-matter area to another.

TABLE I

TESTING AND TRAINING PROGRAM FOR ONE SUBJECT-MATTER GROUP

| | Seven Consecutive School Days | | | | Three Weeks Later | |
|---|---|---|---|---|---|---|
| | Day I | Day II | Days III-VI | Day VII | Day VIII | |
| Fact Class | Otis IQ Test | Reading Selection RA<br>Pre-Test T-1 | Practice on Facts<br>4 Training Periods<br>4 Informal Tests | Reading Selection RB<br>Post-Test T-2 | Reading Selection RC<br>Transfer Test T-3 | Retention Test (Repeat T-2) |
| Relationship Class | Otis IQ Test | Reading Selection RA<br>Pre-Test T-1 | Practice on Relationships<br>4 Training Periods<br>4 Informal Tests | Reading Selection RB<br>Post-Test T-2 | Reading Selection RC.<br>Transfer Test T-3 | Retention Test (Repeat T-2) |
| Generalization Class | Otis IQ Test | Reading Selection RA<br>Pre-Test T1 | Practice on Generalizations<br>4 Training Periods<br>4 Informal Tests | Reading Selection RB<br>Post-Test T-2 | Reading Selection RC<br>Transfer Test T-3 | Retention Test (Repeat T-2) |
| Control Class | Otis IQ Test | Reading Selection RA<br>Pre-Test T-1 | | Reading Selection RB<br>Post-Test T-2 | Reading Selection RC<br>Transfer Test T-3 | Retention Test Repeat T-2) |

## Findings[1]

A. *Gains from Pre-Test to Post-Test*

*Mathematics:*

*Stage One:* No significant differences.

*Stage Two:* The Relationship and Control groups exceeded the Fact group.

*Science:*

*Stage One:* No significant differences found, but a trend was noticed in raw scores placing the groups in the ascending order: Control, Fact, Relationship, Generalization.

*Stage Two:* No significant differences.

*Social Studies:*

*Stage One:* Generalization group higher than Fact and Control groups. Relationship group also higher than Control group.

*Stage Two:* No significant differences.

B. *Transfer Within the Same Subject-Matter Area*

*Mathematics:*

*Stage One:* Generalization group higher than Relationship, Fact and Control groups.

*Stage Two:* Control group was higher than Fact, Relationship and Generalization groups.

*Science:*

*Stage One:* The Generalization, Relationship and Control groups were higher than the Fact group.

*Stage Two:* Generalization group higher than Fact, Relationship and Control group.

*Social Studies:*

*Stage One:* Generalization group higher than the Fact and Relationship groups.

*Stage Two:* No significant differences in total scores.

C. *Transfer From One Subject-Matter Area to Another*

*Mathematics:* The Generalization group exceeded the Fact, Relationship and Control groups.

*Science:* No significant differences.

*Social Studies:* No significant differences.

D. *Retention:*

There were no significant differences found in either Stage One or Stage Two of the retention tests in mathematics, science or social studies.

[1]All differences reported were significant at the .05 level or less. Only total scores were considered.

## Conclusions

1. In the majority of cases, the three methods of study employed in this investigation were equally effective in producing gains in learning as measured by the difference between scores on the pre-test and the post-test. It may be worthy of note however, that where differences occurred the more meaningful methods were favored over the less meaningful.
2. Within the same subject-matter area, the effects of training in the more meaningful methods of study, those of generalization and relationship, appeared to be transferred to a greater extent than did the effects of training in a less meaningful method, that of facts.
3. The effects of training in a more meaningful method of study tended to be transferred from social studies to mathematics to a greater extent than did the effects of training in a less meaningful method. Results of the investigation of transfer from science to social studies, and from mathematics to science did not support this finding since, in general, no significant differences were noted.
4. The effects of training in a more meaningful method of study in social studies appeared to produce greater flexibility of performance in mathematics than did training in a less meaningful method. Again it appeared that these results were specific for the Social-Studies-Mathematics group, since the examination of the other groups failed to produce evidence to support this finding.
5. There was no indication that training in one method of study produced greater retention of material after an interval of twenty-one days than did training in any other method employed in this investigation.

## Discussion of the Results

Where significant differences were obtained in the analysis, the results generally favored the more meaningful approach to learning. Evidence to this effect was most clear-cut in the area of transfer within the same subject-matter field. For the most part, the Generalization group was found to have made significantly higher scores than the Fact group. There were, however, a number of instances in which the Generalization group was superior to the Relationship group, and also a number in which the Relationship group made higher scores than the Fact group.

Subject to corroboration from other investigations, it would appear, then, that pupils should be encouraged to draw conclusions from the material presented in class and to justify conclusions already made in a reading selection. Stress should also be placed

on the development of principles and their application. In other words, to be most effective, techniques should be employed in the classroom which emphasize generalizations rather than the mere facts in a selection.

There were few instances of negative results in the experiment, in the sense that a less meaningful method of study produced superior results. There were, however, many areas of investigation which yielded results that were inconclusive. This was particularly noticeable in the measurement of retention. In the present study the students were not informed during the initial presentation of the material that they would be tested for retention at a later date. It is possible therefore that learning was undertaken without the intent to retain and that consequently performance on the retention test was affected.

It should be noted, too, that as youngsters mature in a good school situation, there is a natural consolidation of traits, habits and attitudes related to methods of study which causes them to become rigid and relatively resistent to change. These attitudes and habits would have a tendency to blur the effectiveness of the present study. It is difficult to see how this situation could have been avoided, however, since selections from the grade seven course of studies served as the material for the experiment.

In the light of this, it is possible that the training periods employed in this investigation were of insufficient length to overcome behavioral patterns resulting from almost seven years of school attendance.

Consideration must also be given to the fact that, concerning methods, the modern teacher is eclectic in choice of techniques to meet the needs of the pupils. As a result of this, the students in the experimental classes would be unaccustomed to the restrictions placed on them during the training periods. Prolonged periods of operation with a single method would very likely tend to reduce the motivation of the class as a whole. This might account for the failure of the post-test to produce evidence of gains in learning, while significant results were obtained with the transfer test.

The position of the Control group in the experiment is worthy of note. It must not be assumed, as is the case in many other investigations, that the Control group was intended to represent the lowest level of attainment in this experiment. Inasmuch as the members of this group were working under usual school conditions with their regular teachers, it was not surprising that in some instances they exceeded the performance of the experimental groups. On the whole the study appeared to indicate that the grade seven classes of the Control group were operating for the most part at a higher

level than the Fact group, but not at the level of the Generalization group. The fact that in many instances there were no differences between the experimental groups and the Control group may also be taken as further indication of the stability or set of the students toward methods of study after seven years in school.

Although there were indications that learning with meaning has been incorporated into the modern classroom, the failure of the Control group to achieve as well as the Generalization group would suggest that learning with meaning has not reached its maximum in current educational practice. Possibly greater emphasis should be given to the development of the ability to read for generalizations than is presently the case. Since habits associated with methods of study seemed to be resistent to change by the grade seven level, it would likely be best to initiate this attention to the development of the ability to read for generalizations early in the school program. If, however, changes in methods of study must be made in later grades, it appears that considerably more extensive training than was employed in the present investigation would be required.

### Implications for Further Study

1. Since the conclusions outlined above must be restricted to the classes and grade involved in this experiment, confirmation and clarification of the findings would result from a repetition of the experiment with other groups of classes and with other areas of subject-matter. Before this was undertaken, consideration should be given to the following suggestions:
   (a) To make the findings more general, an attempt should be made to secure a truly random sample of classes.
   (b) The number of cases in each subject-matter group should be increased so that greater confidence could be placed in the results of the analysis of the data.
   (c) The classes should be matched for mental age, socioeconomic status and previous educational experience in order to restrict sources of variation beyond the experimental situation.
   (d) The use of tests standardized on Alberta populations would provide more reliable measures and make the conclusions of the study more acceptable.
2. The relationship between the meaningfulness of the method of study employed by students in learning and the degree of retention requires further investigation.
3. If the findings of the present study are corroborated by other investigations, experimentation should be undertaken to determine, within each subject-matter area, the classroom techniques that most effectively emphasize meaning in learning.

4. The examination of the transfer of the effects of training in a particular method of study from one subject-matter area to another needs to be extended since the results of the present investigation were inconclusive.

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## BOOK REVIEW

*DYNAMIC DECADE—THE EVOLUTION AND EFFECTS OF THE OIL INDUSTRY IN ALBERTA. By Eric J. Hanson with a forward by Herman F. Otte. Toronto: McClelland and Stewart, Ltd., 1958. pp. XX and 314. $5.00.*

Probably the best way of introducing this book to a Western Canadian public is to refer to its well-known close relatives—earlier works on the Western Canadian economy. *Dynamic Decade* is one of the newest members of the distinguished family of monographs represented by the now-famous *Canadian Frontiers of Settlement Series* published by Macmillan between 1934 and 1940, by Britnell's Depression study, *The Wheat Economy,* and by the recent *Backgrounds of Social Credit in Alberta Series* edited by sociologist S. D. Clark of the University of Toronto. It is also related to other studies which deal with the economy of the West—the prolific, detailed and often soporific reports on Western agriculture, the gloomy Rowell-Sirois Report which so distinctly showed the limits of the Prairie Region economy in 1939, and the more hopeful Gordon Commission Report on Canada's economic prospects from 1955 to 1980.

Though related to these works, *Dynamic Decade* is different in a number of ways. It deals specifically with oil rather than agriculture. It describes an industry of recent arrival rather than one that grew up with the West. It traces the impact of one industry on other sectors of the economy and on the population of a province. It is a sequel to all the works cited with the exception of the Gordon Report, since it deals primarily with the decade of 1947 to 1956. Further, the book has a distinctive format, an unusually complete set of illustrations, charts and tables, a well organized bibliography and a reliable index. To this, add a sound but unobtrusive theoretical orientation, clear, non-technical, and interesting expression, and the drama inherent in the search for oil and its markets. The result is a highly readable book that any alert citizen would enjoy who wanted an understanding of the oil industry and its effects in Alberta and in Western Canada. At the same time it is an indispensable tool for a number of persons who serve Albertans: the politician, civil servant, historian, economist, sociologist, school administrator, teacher or business man.

The book is divided into twenty-five chapters. The first four introduce the study, Alberta, Alberta's resources, and the oil industry. The next seven, which read like an adventure story, trace oil development in Alberta and adjoining provinces from Peter Pound's 1788 report on oil seepage along the Athabasca River near

Fort McMurray to the discovery of Pembina and eleven other oil fields between 1953 and 1956. The remainder of the book is a lucid analysis of the oil industry from 1947 to 1956 and its impact on Alberta's economy. Chapters twelve to twenty are concerned with oil exploration and development, refineries, oil pipe lines, markets for Alberta crude oil, land acquisition, conservation and prorationing, the petrochemical industry in Alberta, natural gas and gas pipelines. Brief historical introductions provide perspective for each of the analyses undertaken in these chapters. The last five chapters deal with Alberta's economy as a whole from 1947 to 1956, with the sources of funds going into the oil industry, with income benefits attributable to oil, with population and employment effects, and with the future of the Alberta economy.

Professor Hanson deserves commendation for writing an interesting, timely and much-needed book. It is a trail-blazer, as was his recent work on local government in Alberta. And Albertans need such trail blazers. The old-time Westerner could understand the agricultural economy because he grew up with it. By contrast, the present-day Westerner needs such studies as *Dynamic Decade* to keep abreast of the rapid changes in his economy and society. If the author's work is a sample of what can be done when a University and an industry, in this case the Imperial Oil Company, team up to release a professor for full-time research and writing, it would appear the procedure should be followed more often. In the long run, writing an up-to-date and authoritative treatise may be more of an educational contribution than teaching classes for a year. This is especially so when teaching is based on out-of-date and regionally inadequate knowledge, as it is frequently in some Western Canadian social studies, social science and education courses. It is to be hoped that other books of comparable merit will be written soon on other phases of Prairie Province life.

B. Y. Card,

September, 1959.

## BOOK REVIEW

*THE FREUDIAN ETHIC. By Richard LaPiere. New York: Duell, Sloan and Pearce, 1959. pp. 299, $5.75.*

La Piere's text should be called "The Decline and Fall of the Protestant Ethic." He accepts, almost without criticism, Max Weber's well-known conception of the 'Protestant ethic.' During the Middle Ages, man passively adhered to the traditional forms of conduct, accepting the fixed social roles he had to play. However a new ethic, latent before, emerged with the Protestant Reformation, which provided a favourable intellectual climate for its acceptance. This new 'Protestant ethic' conceived man as a sturdy, enterprising, self-reliant, responsible, competent, hard-working character, full of initiative and capable of making fairly rational decisions. The fine flowering of this ethic came, for LaPiere, in the North American continent during the late nineteenth and early twentieth century, until a new and radical view of the nature of man began to undermine it.

This was the Freudian ethic which conceived man as a fragile, weak, emotional, libidinous, irresolute character, driven to gratify fundamental pre-rational drives and, accordingly, not responsible for his criminal and anti-social actions. LaPiere believes that the widespread acceptance of this ethic in contemporary society can be seen in the permissive home (too much love and affection), the condonation of crime (the criminal is not responsible for his actions), political maternalism (the emergence of a new bureaucracy which imagines that it knows what we want better than we do ourselves), the new unenterprising organization man living on credit, the spineless student without initiative who never thinks for himself, and last, but far from least, contemporary education, which is pummelled without mercy.

> There is undoubtedly justification for the charge that the public school system provides almost nothing for the mind. It is quite possible for a student to graduate from high school incapable of writing a meaningful sentence, unable to comprehend anything written above the level of the advertisement and the comic strip, unprepared to handle simple fractions, and almost totally unacquainted with the literary, scientific, and historical heritage of his society (pp. 112-113).

The cause of this is that ignoramus, the professional educator, about whom LaPiere, in a short review of the development of faculties of education from the older normal training colleges, makes the following comment:

> Thus there came about an isolation of the professional educators from the sources of human knowledge—science and the humanities—that is now so complete that in every university, the school of education—its faculty, and its students—is viewed with a mixture of anger and contempt by the scientists and humanists (p. 112).

All this is attractive, knockabout argumentative stuff, strictly in line with the new conservative thinking which has risen from the ashes in the last few years. It contains all the logical and factual flaws usually found in this polemical genre: for example, an association between the decline of the 'Protestant ethic' and the rise of the Freudian ethic has no necessary causal implications—indeed existentialist thinking, active long before Freud's published work, is equally corrosive of the 'Protestant ethic' and, in many countries, provides a more accepted version of the nature of man. Despite all this, there is a strand of truth in what LaPiere says, and one is left thinking that surely there must be some middle way, at least for the intelligent man, between the beatnik and the bourgeoisie.

Charles C. Anderson

November, 1959.

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